WHAT IS CLAIMED IS:

1. A low-noise block down-converter receiving M (M≥2) types of polarization signals from each of N (N≥2) satellites, comprising:

N frequency converting circuits each corresponding to one satellite and converting frequency bands of M types of polarization signals received from the corresponding satellite into M intermediate frequency bands that do not overlap one another;

N first signal couplers each corresponding to one satellite and performing frequency-multiplexing of said M types of polarization signals from the corresponding satellite having their frequency bands converted, to generate a first combined signal; and

a signal rearranging circuit selecting any M first combined signals from N of said first combined signals allowing duplicate selection, taking out any one polarization signal from each of the selected first combined signals, and performing frequency-multiplexing of the taken out M polarization signals to generate a second combined signal.

2. The low-noise block down-converter according to claim 1, wherein said signal rearranging circuit includes

a switching circuit having N input terminals and M output terminals, receiving N of said first combined signals and outputting any of said received first combined signals to each of M output terminals,

M frequency controlling circuits each receiving said first combined signal output from a corresponding one of said output terminals and setting signal components included in a corresponding band of said received first combined signal to be any polarization signals included in said received first combined signal, and

M filters each passing signal components of a corresponding band of an output signal of a corresponding one of said frequency controlling circuits, and

a second signal coupler performing frequency-multiplexing of the output signals of said M filters, to generate a second combined signal.

3. The low-noise block down-converter according to claim 2, wherein

said frequency controlling circuits each include a switch that can be switched arbitrary, and a mixer,

said switch receives said first combined signal output from a corresponding one of said output terminals, and outputs said first combined signal to said filter without any change in a first state, and outputs said first combined signal to said mixer in a second state, and

said mixer mixes said first combined signal and a signal of a prescribed frequency, and outputs the mixed signal to said filter.

4. The low-noise block down-converter according to claim 2, wherein

said switching circuit of said signal rearranging circuit further includes M output terminals, and outputs any of said received first combined signals to each of M output terminals,

said signal rearranging circuit further including

M frequency controlling circuits corresponding to signals output from said M output terminals, M filters corresponding to outputs of said M frequency controlling circuits, and one signal coupler corresponding to outputs of said M filters, and generating two second combined signals, and

said low-noise block down-converter includes K ($K \geq 2$) of said signal rearranging circuits.

5. A low-noise block down-converter, comprising:

a switching circuit including $N \times M$ ($N \geq 2$, $M \geq 2$) input terminals and M output terminals, receiving M types of polarization signals from each of N satellites, and

outputting any of said received polarization signals to each of M output terminals;

a frequency converting circuit converting frequency bands of M polarization signals output from said switching circuit into M intermediate frequency bands that do not overlap with one another; and

a signal coupler performing frequency-multiplexing of said M polarization signals having their frequency bands converted, to generate a combined signal.

6. A low-noise block down-converter receiving M (M≥2) types of polarization signals from each of N (N≥2) satellites, comprising:

N frequency converting circuits each corresponding to one satellite and converting frequency bands of M types of polarization signals received from the corresponding one satellite into M intermediate frequency bands that do not overlap one another;

M switching circuits each corresponding to a type of said polarization signals, and receiving a corresponding one type of said polarization signals from N satellites having its frequency band converted, and outputting any of said received polarization signals; and

a signal coupler receiving said M polarization signals from said M switching circuits and performing frequency multiplexing of said M polarization signals to generate a combined signal.

7. A satellite broadcasting receiving apparatus receiving M (M≥2) types of polarization signals from each of N (N≥2) satellites, comprising:

a low-noise block down-converter including

N frequency converting circuits each corresponding to one satellite and converting frequency bands of M types of polarization signals received from the corresponding satellite into M intermediate frequency bands that do not overlap one another;

N signal couplers each corresponding to one satellite and performing frequency-multiplexing of said M types of polarization signals from the corresponding satellite having their frequency bands converted, to generate a first combined signal; and

a signal rearranging circuit selecting any M first combined signals from N of said first combined signals allowing duplicate selection, taking out any one polarization signal from each of the selected first combined signals, and performing frequency-multiplexing of the taken out M polarization signals to generate a second combined signal; and

a tuner receiving said second combined signal output from said low-noise block down-converter, and performing a tuning process and a decoding process based on said second combined signal.